PHASEP MINI & JUNIOR SEPARATOR TRAMP OIL REMOVAL SYSTEM PARTS AND SERVICE MANUAL

Thank you for choosing an LNS Tramp Oil Removal System. We are proud to have you among our LNS family of users.

LNS' Tramp Oil Removal Systems simply and reliably remove tramp oil from coolant. This patented oil removal technology will improve metal working fluid life by at least 50%. Since oil contamination is the most common cause of metal working fluid disposal this system will reduce the need for hazardous waste disposal. Machine efficiency is increased and operator safety is improved since these Tramp Oil Removal Systems work with little maintenance attention and without interrupting production time. LNS Tramp Oil Removal Systems are available in many sizes and for various applications. For further information, contact:

Inside Sales Department
LNS TURBO
203 Turbo Drive
Kings Mountains, NC 28086

This Service Manual is intended to assist with the normal maintenance that will assure long service life of your LNS Tramp Oil Removal System. It is in two parts – a Service Instruction Section, followed by a Parts Section, which includes drawings and parts lists for the basic elements of the conveyors.

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2. INSTRUCTIONS FOR ORDERING PARTS

INSTRUCTIONS FOR ORDERING PARTS

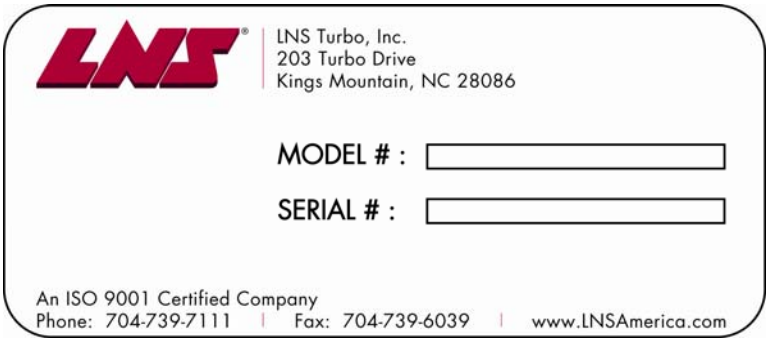
Furnish the following information on your order:

- Model and serial no. of machine
- Catalog number and name of part
- Quantity wanted
- Purchase order number
- Bill to address

Furnish exact shipping instructions:

- Complete shipping address
- Mode of delivery
- Parcel post, truck line, etc

How to find the model and serial number of your machine:
The machine model number and serial number is stamped on the machine nameplate located on the reservoir of the unit.



DIRECT YOUR ORDER TO:

LNS Turbo
203 Turbo Drive
Kings Mountains, NC 28086 U.S.A.
Telephone: (704) 739-7111 Fax: (704) 739-6039

WARRANTY

Seller warrants that within 12 months from original shipment, if its products are operated by the original specified user: Seller will repair or replace, at its option, free of charge except freight, FOB shipping point, any parts it finds nonconforming on these conditions:

a. on request, user promptly allows seller to inspect, and user returns all requested parts to seller's plant, and
b. user has operated and maintained products in accordance with seller's maintenance and operational literature and good business practice; and
c. products have not been misused, abused, damaged by accident or altered without seller's written consent; and
d. user employs trained maintenance and operating personnel; and
e. buyer meets all payment obligations;

Seller warrants products manufactured by others to the extent warranted by their original manufacturers, on these conditions. Parts, which have expected life shorter than one year under normal usage, are excluded.
USED PRODUCTS ARE SOLD AS IS. SELLER MAKES NO WARRANTY FOR USED PRODUCTS EXCEPT AS TO TITLE. BUYER MAY INSPECT AND TEST BEFORE SHIPMENT AND ACCEPTS USED PRODUCTS ON THESE TERMS.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER WRITTEN, ORAL, OR IMPLIED, (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.)

TYPICAL APPLICATIONS

LNS' Tramp Oil Removal Systems can be utilized anywhere there are two distinct phases of liquid (i.e. oil and water). Most commonly, the applications are machine coolant and parts washer fluids. LNS' Tramp Oil Removal Systems have been utilized to remove oily wash water from parking lots, holding tanks on large semi truck washing stations, air compressor blow down, and many other applications.

Applying the LNS Tramp Oil Removal System is very straightforward. The two easiest ways to determine whether this coalescing unit can be used to separate two liquids are as follows below:

1. **Visually inspect the liquid in the tank or sump. If there is a visible oil layer in the system, the LNS Tramp Oil Removal System can be applied.**

2. **The second method requires that a sample of the fluid to be separated be taken. The sample is placed in a bottle. Let the liquid rest for ten to fifteen minutes. If there are distinctly visible phases of liquid present in the sample, the LNS Tramp Oil Removal System will work well.**

The LNS Tramp Oil Removal System is not capable of separating chemically emulsified products. However, LNS Tramp Oil Removal Systems will significantly reduce the level of mechanically emulsified oils in a liquid. An example of a mechanical emulsion is oil that has been run through a centrifugal pump a number of times. This type of emulsion will typically be seen as a separate phase of liquid. Pure oil will be the top phase, mechanical emulsion as the second phase and the base fluid as the third phase.

Successful LNS' Tramp Oil Removal System applications include:

- **Machine Tool Coolants**
- **Mop/Wash water**
- **Compressor Blow down**
- **Oil Spill Clean up**
- **Rain Water Run-off**
- **Retention tanks at Vehicle wash stations**
- **Quenching tanks**

HOW TO PROPERLY SIZE LNS' TRAMP OIL REMOVAL SYSTEMS

Properly sizing the LNS Tramp Oil Removal System is fairly simple. As a basic rule, the unit should produce five to seven turnovers of the entire liquid volume in a 24-hour period. An example is below:

A customer has a 500-gallon tank. Multiply 500 by five (turnovers) and the liquid volume we need to process is 2500 gallons. Divide 2500 gallons by 1440 (1 gallon per minute over a 24 hour period) and the number is 1.736. This represents the size of the coalescing unit needed to get the minimum five turnovers in 24 hours.

500 gallons X 5 turnovers = 2500 / 1440 = 1.736

Round up to the next highest whole number, in this case the application calls for a unit capable of producing two gallons per minute.

If the unit cannot operate 24 hours per day, the size of the coalescing unit should be increased to accommodate the necessary five turns per day.

If the customer operates three shifts per day, the size of the coalescing unit should be larger to accommodate the constant influx of oily waste into the fluid. The larger size will help eliminate the waste oil before it has an opportunity to become emulsified into the fluid.

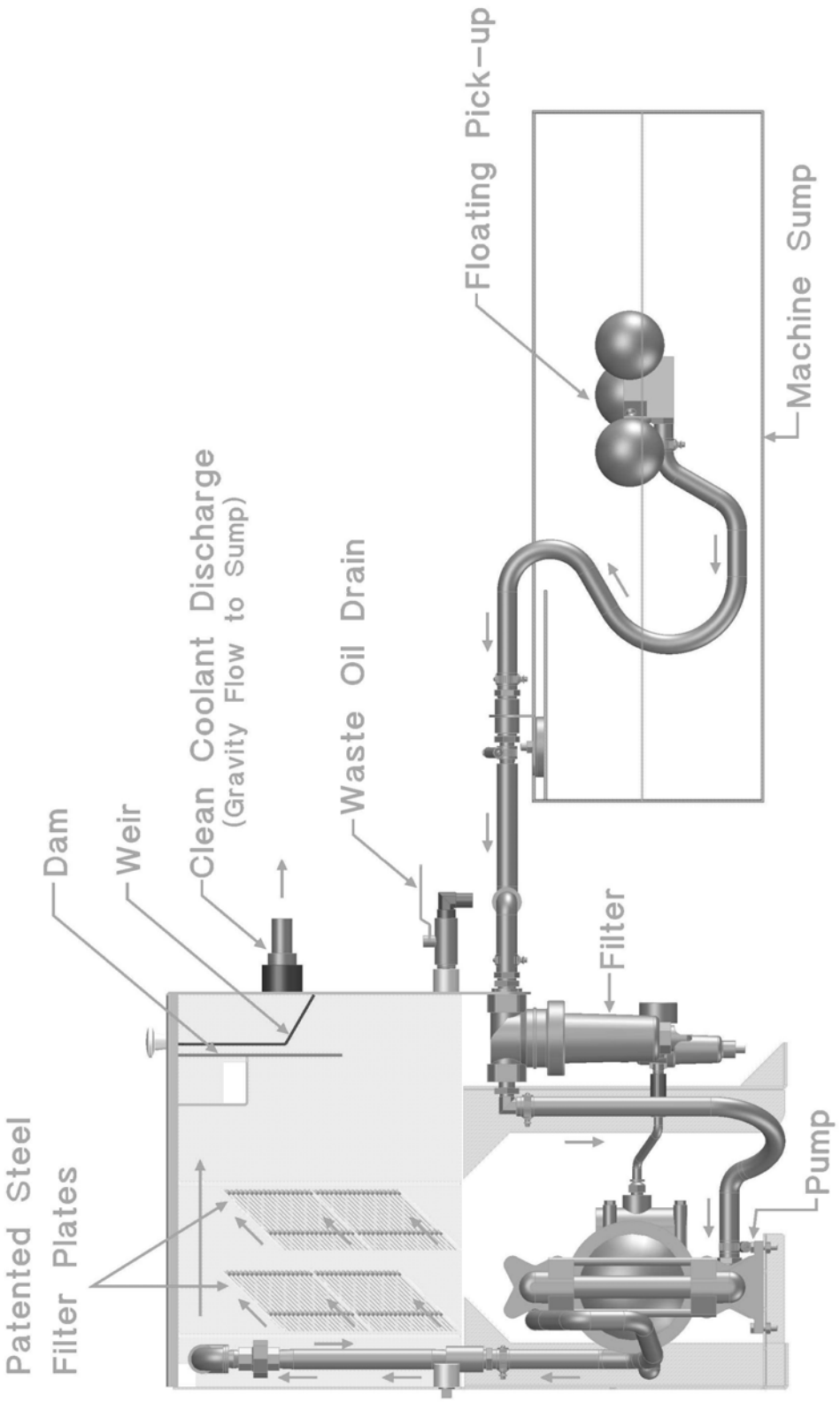
THEORY OF OPERATION

The LNS Tramp Oil Removal Systems use steel plate pack systems for a coalescing media. When an oily liquid is brought into the coalescor, oil droplets want to naturally rise to the surface. The actual droplet size of the oil determines how quickly each droplet will rise in a liquid. As a general rule, larger droplets will rise faster than smaller ones. It is these smaller droplets that the coalescor unit is designed to collect better than competitive coalescors.

The steel plates of the plate pack system give oil a surface to make contact with. Once contact is made, the droplet temporarily sticks to the plate surface. Our plate packs are designed with a 45° angle to allow the oil droplets to slowly migrate up that angle until they have reached the edge of the plate. During the journey, the oil droplets break away from the edge of the plate and rise to the surface of the coalescing unit where they will be skimmed off by an internal skimming tube.

LNS Tramp Oil Removal Systems are designed to create a Laminar flow. This means that the flow through the coalescor is non turbulent. A non-turbulent environment allows smaller droplets to rise more quickly. LNS Tramp Oil Removal Systems also creates a very slow flow through the unit. Typically, the flow through the coalescor is one linear foot per minute or less. This is a very important element to the success of the coalescor. Combined with the non turbulent, laminar flow, the very slow liner motion of the liquid, allows the coalescor to remove droplets in the size range of 20 microns.

Once the liquid has passed through the coalescing plates, there is a retention dam near the end of the coalescing unit. This retention dam serves to keep the coalesced oil in the top of the coalescing unit from discharging back into the liquid from which it came. Clean fluid flows beneath the retention dam and exits out of the coalescing unit. The LNS Tramp Oil Removal Systems operate on a bypass loop allowing for repeat flow through the plate packs. With average conditions, the liquid discharging form the coalescing unit is 98% or higher, free of waste oil.


Floating Pick–up
Machine Sump
Clean Coolant Discharge
(Gravity Flow to Sump)
Waste Oil Drain
Dam
Weir
Filter
Pump
Patented Steel
Filter Plates

INSTALLATION AND MAINTENANCE

COOLANT TANK PREPARATION

If the wash solution or coolant in your equipment is heavily loaded with dirt and oil the sumps should be drained, cleaned and recharged with fresh solution or coolant.

NOTE: In the above case, you may elect to fill the separator with clean coolant and begin processing. Many times this is acceptable although the overall processing time will be lengthened.

SEPARATOR TANK LOCATION AND OPERATION

The discharge height of the separator must be high enough to insure unimpeded gravity flow back to the tank of your equipment.

Easy access to the separator cover, pump control, separator sump and oil skimmers should be provided.

Locate the unit on a level surface. The separator must be level to insure maximum performance. Charge the separator with clean coolant or wash water. The tank is correctly filled when fluid starts to flow out the “FLUID OUTLET” port.

SET-UP PROCEDURE

1. Remove the tramp oil removal system from the packaged skid or box and inspect the unit to insure there is no damage.
2. Lift the lid of the tramp oil reservoir and remove any loose parts (skimmer, hoses, manuals, etc.) that are packaged inside the unit when shipped. Do not remove the plate pack modules.
3. Position the tramp oil removal system near the tool tank from which the tramp oil will be pumped. Level the unit using the four leveling bolts provided at the base of the tramp oil removal system. Note that this unit must be leveled from both front to back and side to side to insure proper operation.
4. Connect the corrugated suction hose to the hose fitting located on the strainer filter, which is on the unit. “Do not cut the hose at this time.”
5. Locate an area on the tank that tramp oil will be pumped from and mount the hose stabilizer assembly. This assembly is magnet is can be attached to the tank easily. It is provide simply to keep the suction hose in place so the float sits level in the coolant.
6. Once the hose stabilizer assembly is properly positioned, cut the corrugated suction hose to provide the proper length from the filter to the hose stabilizer. Secure the hose clamps to make sure no air can be suctioned at the fitting connections. If the hose connection and fittings leak the unit will not properly operate.
7. Find the area on the tank that has the least amount of turbulence. Typically an area partitioned by baffles from any coolant pumps is ideal as long as floating tramp oil can freely flow into this area. Position the float assembly in this area. Cut the remaining corrugated suction hose to length from the float assembly to the fitting on the hose stabilizer assembly. Make sure the hose is not kinked or twisted before tightening the hose clamps. Insure the float assembly is positioned level in the liquid to be pumped

into the tramp oil removal system, otherwise the unit will not operate properly. If the float assembly is positioned under a tank cover, insure that the top of the floating balls never come into contact with the bottom of the tank covers. If they do, the unit will only suction clean liquid and not skim the tramp oil, which floats on top of the liquid. Also insure that the coolant level in the tank will never be so low that the balls come into contact with the bottom of the tank. In this case no liquid from the tank can be pumped.

8. Connect the clear 1" I.D. drain hose the barbed fitting on the unit, which is labeled "fluid outlet" and route it from the tramp oil removal system back into the tank from which the tramp oil is being suctioned.
9. Once all of the hoses have been installed check the drain valve on the tramp oil removal system and insure that the drain valve is in the "closed" position.
10. Connect the customer supplied air supply hose to the quick connection fitting located on the pneumatic regulator assembly. If the customer's female quick connection fitting is not compatible with the male quick connection fitting provide on the tramp oil removal system, please change the quick connection fitting on the regulator to be compatible with the customer's female quick connection fitting.
11. Check the leveling of the tramp oil removal system once again to insure that it properly leveled. The unit is now ready to be filled and operated.

Pump Operation Air Diaphragm Pump

FOR CPS-MINI ¾ GPM FLOW RATE

The All Flow ½" pump is capable of operating at a maximum flow of 14 gallons per minute. The pump should not be operated at more than 1 gallon per minute due to potential overflow of the mini coalescor. The CPS-MINI is designed for optimal efficiency at ¾ gallon per minute flow rate.

To achieve the ¾ gallon per minute flow rate, the steps below must be followed.

Step 1.
Set the Air regulator to 40 psi. This can be done by adjusting the yellow knob on top of the filter regulator assembly. (Warning!) The knob is a lock down style. It may be necessary to pull up on the knob before turning. Failure to do so could cause damage.

Step 2.
To maximize your coalescor, the pump should not cycle more than 63 beats per minute. The beats per minute can be adjusted with the flow control valve located between the filter regulator and the pump. Any faster rate will minimize the unit's efficiency and could cause a potential overflow. If at 40 psi the pump fails to begin operating, simply adjust **the needle valve** slightly higher until the pump begins to cycle. Reduce the flow back down to allow the 56-63 cycles per minute flow rate to insure proper operation.

FOR CPS-JR 1.5 GPM FLOW RATE

The All Flow ½ inch pump is capable of operating at a maximum flow of 14 gallons per minute. The pump should not be operated at more than 1.5 gallons per minute due to potential overflow of the Junior coalescor. The CPS-JUNIOR is designed for optimal efficiency at 1 ½ gallon per minute flow rate. To achieve the 1 ½ gallon per minute flow rate, the steps below must be followed.

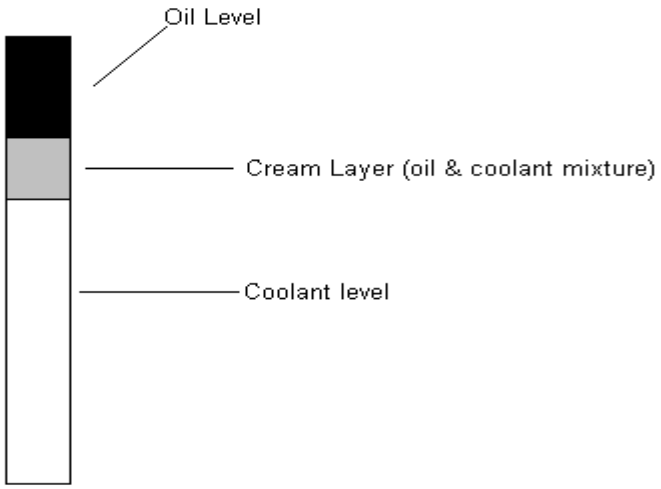
Step 1.
Set the Air regulator to 40 psi. This can be done by adjusting the yellow knob on top of the filter regulator assembly. (Warning!) The knob is a lock down style. It may be necessary to pull up on the knob before turning. Failure to do so could cause damage.

Step 3.
To maximize your coalescor, the pump should not cycle more than 80 beats per minute. Any faster rate will minimize the unit's efficiency and could cause a potential overflow. (It may be necessary to run the pump faster to get the initial prime. If at 40 psi the pump fails to begin operating, simply adjust the **needle valve** until the pump begins to cycle. Reduce the cycles per minute to no higher than 80 cycles per minute to insure proper unit operation.

Evaluating Oil Levels in the PhaSep Coalescor

It is not uncommon to notice two to three different phases of liquid in the separation tank Generally, a one to one and one half inch level of oil should be kept on the surface to prevent any coolant from being skimmed off into the oil holding tank.

The sketch below is characteristic of what can occur in the separation tank.
The oil level should be approximately 1" deep. The cream layer is normally ½ of the depth of the oil layer.



Waste oil should be removed from the unit on a regular basis to avoid an excessive build up. If an intermediate layer (reverse emulsion) is evident, this should be removed regularly as well. To avoid coolant or cleaning solution loss, always maintain a minimum of 1/4 of inch waste oil on the surface of the coalescor.

Separator Clean Out Procedure

Turn off the pump.

Drain off the waste oil.

Once all of the oil has been removed from the surface of the separator lower the discharge hose and allow the liquid level to return to the level of the overflow weir.

Drain the remaining liquid from the separator. Using the ”TANK DRAIN” port, first drain off the solids that have collected on the bottom of the unit, then drain the remaining clean coolant. The clean liquid should be saved for reuse if possible. Do not mix any dirt or particulate on the bottom of the separator with the clean liquid.

Remove the separator plates from the tank and wash with fresh water or a steam hose. In the case of carbon steel plates, these should be placed back in coolant before surface rusting occurs.

Remove all solids and any oil from the sides and bottom of the separator tank, and thoroughly clean the tank prior to reinstalling the plate packs. Plates should be installed in up flow sequence with the incline of the plate pack positioned as shown in the diagram on page 5.

Recharge the tank with the clean liquid removed. Turn on the system and allow the separator tank to refill. Adjust the slotted pipe skimmer to the desired height and replace the tank cover. Check all hose connections, fittings and gaskets for leaks and tighten if required.

Additional Maintenance Requirements:

A daily check of the floating skimmer is recommended to insure that the skimmer inlet is not blocked by floating solids.

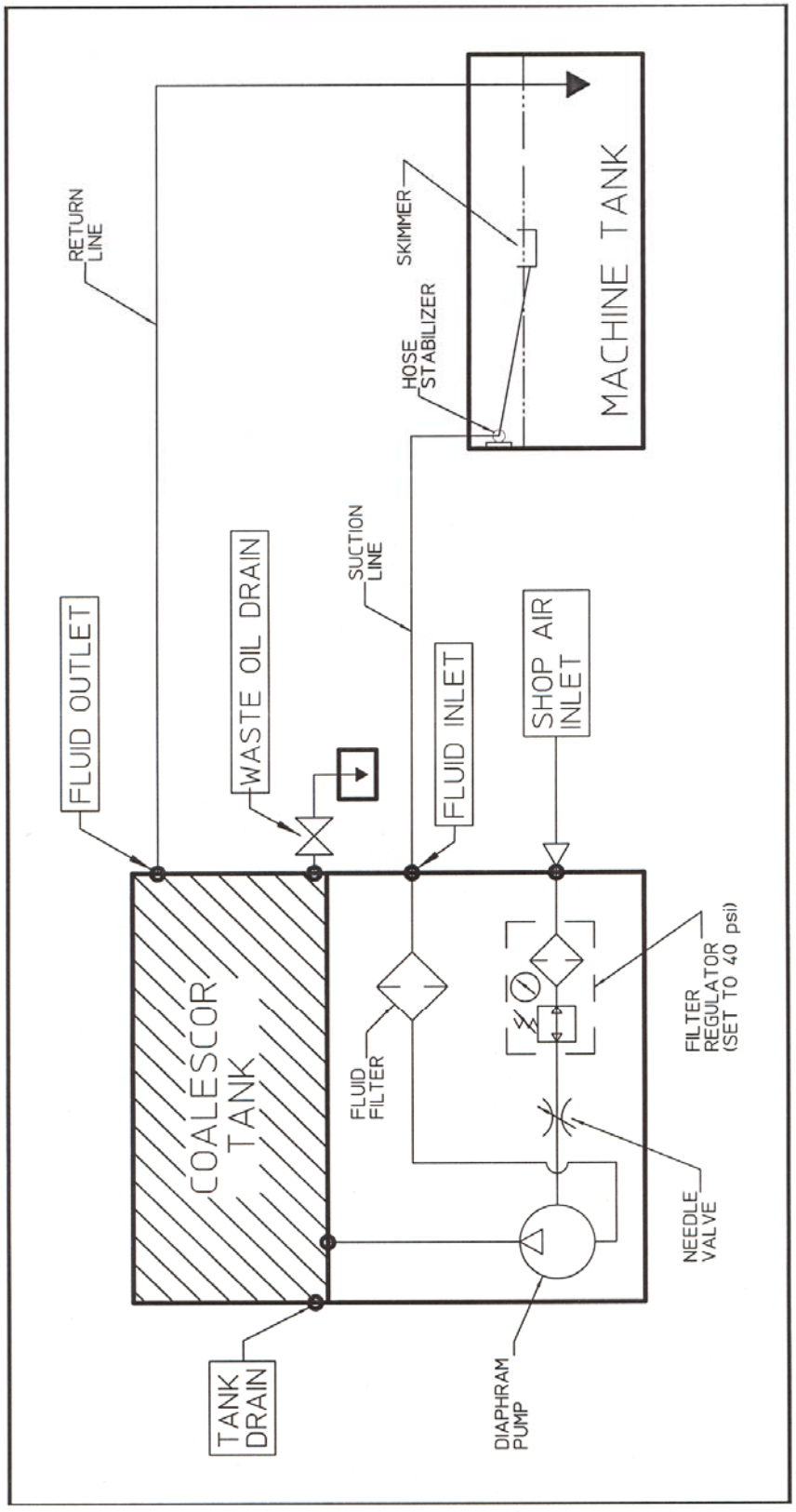
A periodic check of the unit flow rate is recommended. This unit is designed for a flow rate indicated on the page 7 of the manual, depend upon the separator model. A simple check can be performed by allowing the discharge hose to flow into a container of a known volume while timing the process. The discharge flow rate should fill the container in an amount of time that equates to the prescribed gallons/minute.

FLOTATION ADJUSTMENTS

If your unit is equipped with a Stainless Steel Vortex float, there is no adjustment of the float. You only need to make sure the float is in an upright and level position with the triangular opening of the float box pointed upwards. The straight hose fitting should be below liquid level.

To maximize your float potential, tighten the gray corrugated hose with a hose clamp around the straight fitting. A hose clamp should have been provided for this purpose and should be securely tightened so that no air leakage occurs at the hose and fitting connection.

TYPICAL SCHEMATIC WITH PNEUMATIC PUMP



PUMP MAINTENANCE PROCEDURES

CHECK VALVE AND O-RING MAINTENANCE

1. Flush and neutralize the pump to be certain all-corrosive or hazardous materials are removed prior to any maintenance. This procedure should always be followed when returning pumps for factory service.
2. Remove the nuts (19) and washers (10) from the four long pumping cap screws (35). Suction check valve seats and check balls (26, 27) are located inside of the bottom of the outer chamber (28). Gently remove and inspect for excessive wear, pitting or other signs of degradation. Inspect valve seat o-rings (38). Replace if necessary. Discharge check valves are located inside of the bottom of the discharge elbows (28). Repeat procedure for inspection of discharge check valves.
3. To inspect the manifold o-rings remove the eight sets of nuts, washers and bolts (10, 19, 20) from each manifold assembly and replace if necessary. Then reassemble and lightly tighten fasteners. Tighten all external fasteners to final torque requirements after pump is completely assembled. The check ball should fit into the curved portion of the valve seat and be facing upward when reinserted into the valve seat location.
   NOTE: When using pumps built with Teflon o-rings always replace with new Teflon o-rings, since the original o-rings will not reseal the pump.

DIAPHRAGM AND PILOT SLEEVE ASSEMBLY MAINTENANCE

1. To inspect diaphragms, remove the band clamps (16) from the outer pumping chambers (28). If replacement is necessary due to abrasion or rupture, unscrew the outer diaphragm plates (29). Models that are built with Teflon elastomers will have a Teflon overlay (30) that faces the outer pumping chamber and a back-up diaphragm (31) on the airside of the pump. Pumps without Teflon will contain only the back-up diaphragms.
2. If there has been a diaphragm rupture and corrosive or viscous fluid has entered the airside of the pump the complete air system should be inspected. After removing the diaphragm plate (33), the pilot sleeve assembly (14, 49, 42, 45-47) and the diaphragm rod assembly (13, 15) may be removed by removing the retaining plates (41) (you may only need to remove one retaining plate) and pushing the entire unit out through the bore in the intermediate (34). The diaphragm rod assembly must be unscrewed to remove the pilot sleeve.
   NOTE: To aid in reassembly use a non-synthetic, petroleum based lubricating grease without EP additives. Carleton-Stuart MagnaLube G is recommended.
3. Clean or replace any components that have excessive wear, dirt build-up or chemical attack. Lube all components prior to reassembling. Reassemble pilot sleeve spacers, o-rings and lip seals (40) within bore of intermediate. Make sure that the open side of the lip seals is facing outward toward the diaphragms. Also make sure that the end pilot spacers (14) are at the end of either side of the pilot sleeve assembly and all inner spacers (47) are separated by o-rings. Next carefully insert the diaphragm rod assembly with the pilot sleeve inside the assembly in the bore. Reattach retaining plates. Do not over tighten self-tapping screws (24)

4. Take one diaphragm and invert (reverse the natural bow of the material) and with the curved side of the inner diaphragm plate facing the diaphragm assembled onto the outer diaphragm plate stud and then screw the assembly into the diaphragm rod. Push the diaphragm rod to the opposite side of the intermediate and add the opposite diaphragm assembly. Tighten the outer diaphragm plate to70 in-lbs of torque.
   NOTE: Inverting the first diaphragm aids reassembly.
5. Position the outer diaphragm chambers onto intermediate making sure that the witness lines are matching.
   NOTE: If the air valve has been removed, proper orientation of the air system with fluid chambers must be observed. The top of the intermediate has a single vertical air passage slot on the air valve mounting face while the outer chamber check ball cavity should be pointing downward.
6. When positioning band clamps, use soapy water or a compatible lubricating spray on the inside of the band clamps to aid assembly. Tap with a mallet on the outside of the clamp to help position the clamp while tightening the fasteners. The band clamp fasteners are stainless steel. To prevent galling always apply an anti-seize compound to the thread. Tighten all external fasteners to final torque requirement after the pump is completely assembled.
7. Position the reassembled manifolds making sure of the proper orientation in relation to the air valve for your application. Also make sure that the valve seat o-rings do not shift from their grooves during reassembly. Flat washers should be placed under the head of each cap screw and nut. Tighten all external fasteners to final torque requirement after the pump is completely assembled.

EXTERNAL FASTENER TORQUE REQUIREMENTS

NOTE: When reassembling loosely tighten all external fasteners adjusting and Aligning and gradually, in an alternating fashion, tighten to torque requirements listed below:

BAND CLAMPS: 13.3 ft-lbs
MANIFOLD BOLTS: 20 in-lbs
OUTER CHAMBER CAP SCREWS: 20 in-lbs

AIR VALVE MAINTENANCE

1. To evaluate the air valve components, remove the four cap screws (11), washers, (25, 10) and nuts from the air valve body (7). The valve plate (5) and shuttle (6) may be inspected by removing them from their location in the slot in the back of the air valve. Inspect for scratches or surface irregularities. Replace if necessary. To remove the plug (1) at the bottom of the air valve, point the bottom of the air valve safely away from any people, direct compressed air through one of the lower holes in the back of the air valve body and the plug will shoot out. Next push the air valve spool (2) out of the air valve body. Gently reach in and pull the lip seals (43) out of the inside bore of the air valve body. Check for cracks, splitting or scratches. Clean components if replacement is not necessary. Inspect the plug o-ring (44) for any damage and replace if necessary and reinsert in the o-ring groove.

NOTE: Make sure that the open side of the two lip seals face each other when reassembling the air valve. Lube all components with suggested maintenance grease as an aid in reassembly.

2. Reinsert the air valve spool inside of the air valve body. Place the shuttle on the middle rib of the air valve spool, through the square slot in back of the air valve. If using the original valve plate, lubricate the side of the plate that was facing the shuttle (or if new valve plate is used lubricate the lapped and polished side of the plate) and place the lubricated side next to the shuttle in the slot. Press the valve plug into the air valve body, chamfered end first.
3. Check that the gaskets (3, 4) are not cracked. If damaged, replace.
4. After gaskets are pressed back into position, align air valve onto intermediate and reinsert the four cap screws with lock washers and flat washers. Apply 60 in-lbs of torque to fasteners.

TRAMP OIL REMOVAL SYSTEM TROUBLE SHOOTING GUIDE

The following chart will show some problems, their probable causes and possible solutions.

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
(1) Air is applied to the pump but the pump is not starting:	(a): In-line filter strainer is clogged or supply hose(s) is blocked.	Clean in-line filter strainer and all suctions hoses of chips or debris.
	(b): Insure the suction skimmer float is seated properly in the coolant or fluid to be pumped.	Properly seat the suction skimmer float into the coolant or fluid. It should be seated so the ball floats are level and fluid is being suctioned into the vortex.
	(c): Pump diaphragm(s) is damaged.	Disassemble pump and inspect the diaphragm for damage. Replace if necessary.
	(d). Air pressure is not sufficient to operate the pump.	Check air pressure to insure it is at least 20 PSI (1.3 Bar).
(2) Pump is pumping but not priming:	(a). Suction line has a leak.	Check all suction line connections for leakage.
	(b). Check valve has excessive wear.	Inspect check valves for wear or debris.
	(c). Suction lift specification may be exceeded.	Check pump suction lift specifications.
	(d) Fluid is too viscous for suction line size.	If fluid is viscous use a larger suction line
	(e) Skimmer Float is not properly seated in the fluid.	Properly position float in the fluid so that it is level.
(3) Coolant leakage onto the floor:	(a) Pump fasteners are too loose.	Retorque all pump fasteners to specified torque requirements.
	(b) Worn or damaged pump o-rings.	Replace o-rings.
	(c) Pump diaphragm is damaged.	Inspect pump diaphragms for rupture.
(4) Too low of flow rate:	(a) Air pressure or capacity is insufficient.	Insure proper air pressure and air capacity at the air valve.
	(b) Suction line has a leak.	Check for leaks in suction lines and repair if necessary.
	(c). Suction line is obstructed)	Check for obstructions in suction line. If necessary clear these lines before resuming operation
	(d). Fluid is too viscous for suction line size.	If fuild is viscous use a larger suction line.
	(e) Check fluid temperature and viscosity.	Viscosity of fluid may have increased if temperature is lower.
(5) Air in discharge lines:	(a) Suction line has a leak.	Check for leaks in suction lines and repair if necessary.
	(b). Pump diaphragm is damaged.	Inspect pump diaphragms for rupture and repair if necessary.
(6) Erratic Cycling:	(a). Pump check valve seats are dirty.	Inspect pump check valve seats for debris. Clean if necessary.
	(b). Fluid line are obstructed.	Inspect fluid lines for debris. Clean if necessary.
	(c). Automatic valves are malfunctioning.	Automatic valves must be properly functioning. Repair if necessary.
	(d). Viscosity of fluid is changing.	Viscosity of product may be changing. Determine cause and correct problem.

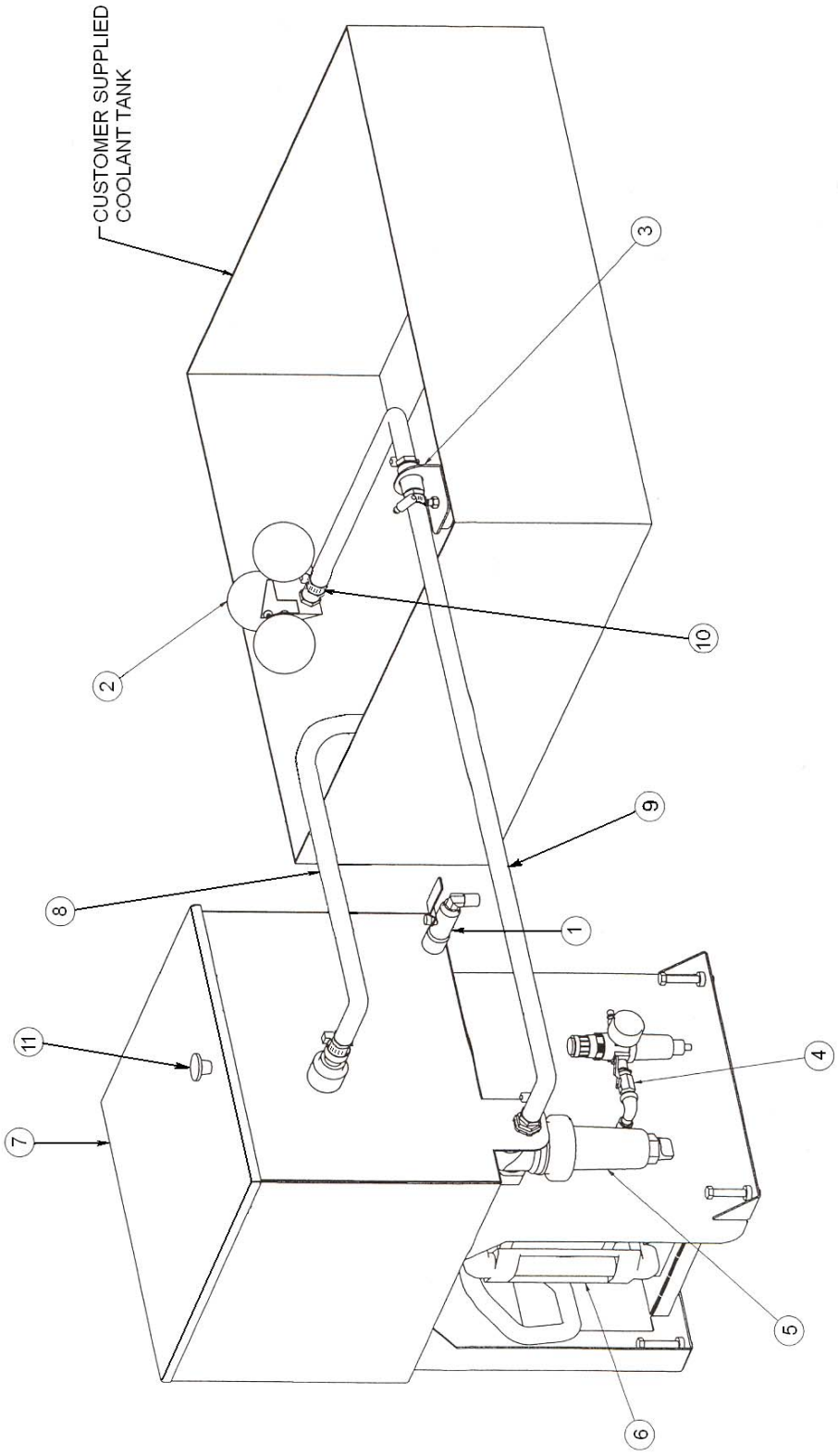
PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
(7) Premature destruction of pump wetted components.	(a). Fluid has abrasive materials which are pumped through the system.	If the fluid is abrasive, slow down the pump or increase the size of the pump.
	(b). Inadequate filtration upstream from the pump.	Filter fluid for sharp objects.
	(c). Pump components are incompatible with the fluid being pumped.	Make sure fluid is compatible with wetted materials.
(8): Excessive clean coolant is in the tramp oil reservoir.	(a). Tramp oil tank reservoir is not level.	Level tramp oil reservoir.
(9): Excessive tramp oil is be drained back into the discharge hose.	(a) Tramp oil tank reservoir is not level.	Level Tramp oil reseroir.
	(b) Pump is operating too fast.	Adjust air pressure and needle valve to insure proper air supply pressure and pump strokes per minute per set up procedures.
	(c). Plate packs are dirty or damaged.	Inspect plate packs in repair or clean if necessary.

TRAMP OIL REMOVAL SYSTEM MAINTENANCE SCHEDULE

The following chart shows a suggested maintenance schedule for the conveyor to insure proper operation and longevity.

Time Frame	Procedure	Problem	Resolution
Daily	Inspect skimmer to insure it is floating level in the fluid.	Skimmer not positioned correctly in fluid.	If necessary, reposition float, reroute hose or clamp hose to insure it does not move.
Daily	Lift lid and inspect tramp oil build up.	Tramp oil reservoir full of tramp oil.	Drain off and discard excess tramp oil, which has accumulated in the tramp oil collection reservoir.
Weekly	Inspect tramp oil tank to insure it is leveled properly and has not been moved out of position.	Too much clean coolant in the tramp oil reservoir or too much tramp oil returned to the clean sump.	Re-level unit if necessary.
Weekly	Inspect filter element to insure it is not clogged.	No or low pump flow.	Remove the filter element; discard contaminants and clean element before reinstalling. Suggested weekly frequency may vary depending upon customer's application.
Monthly	Inspect hoses to insure there are no blockages from the float to the discharge line.	No or low pump flow.	Remove obstructions as necessary.
Monthly	Inspect pump for proper operation to insure even and consistent flow and check for any signs of seal leakage.	Coolant leakage or erratic pump flow rate.	Refer to pump maintenance section of this manual for repairs if necessary.
Monthly	Inspect hoses to insure they are in good condition, properly positioned and that all pipe fittings and hose clamps are securely tightened.	Foaming occurs or the system does not operate effectively.	Replace damaged hoses, properly position hoses, tighten fittings and hose clamps as necessary.
Every 3 months	Inspect plate packs to insure they are in good condition and are not covered with a build-up of sediment and thick tramp oil.	System is not separating tramp oil effectively.	Repair plate packs if necessary and gently wash to remove any accumulated sediment build-up.
Every 6 months	Inspect tramp oil tank for accumulated sludge and grime.	Tramp oil tank capacity is reduced or system is not effective.	Drain all tramp oil out of tramp oil reservoir, empty all fluids and clean the accumulated sediment and oil from the tramp oil tank and plate packs. Frequency may vary depending upon customer's application.

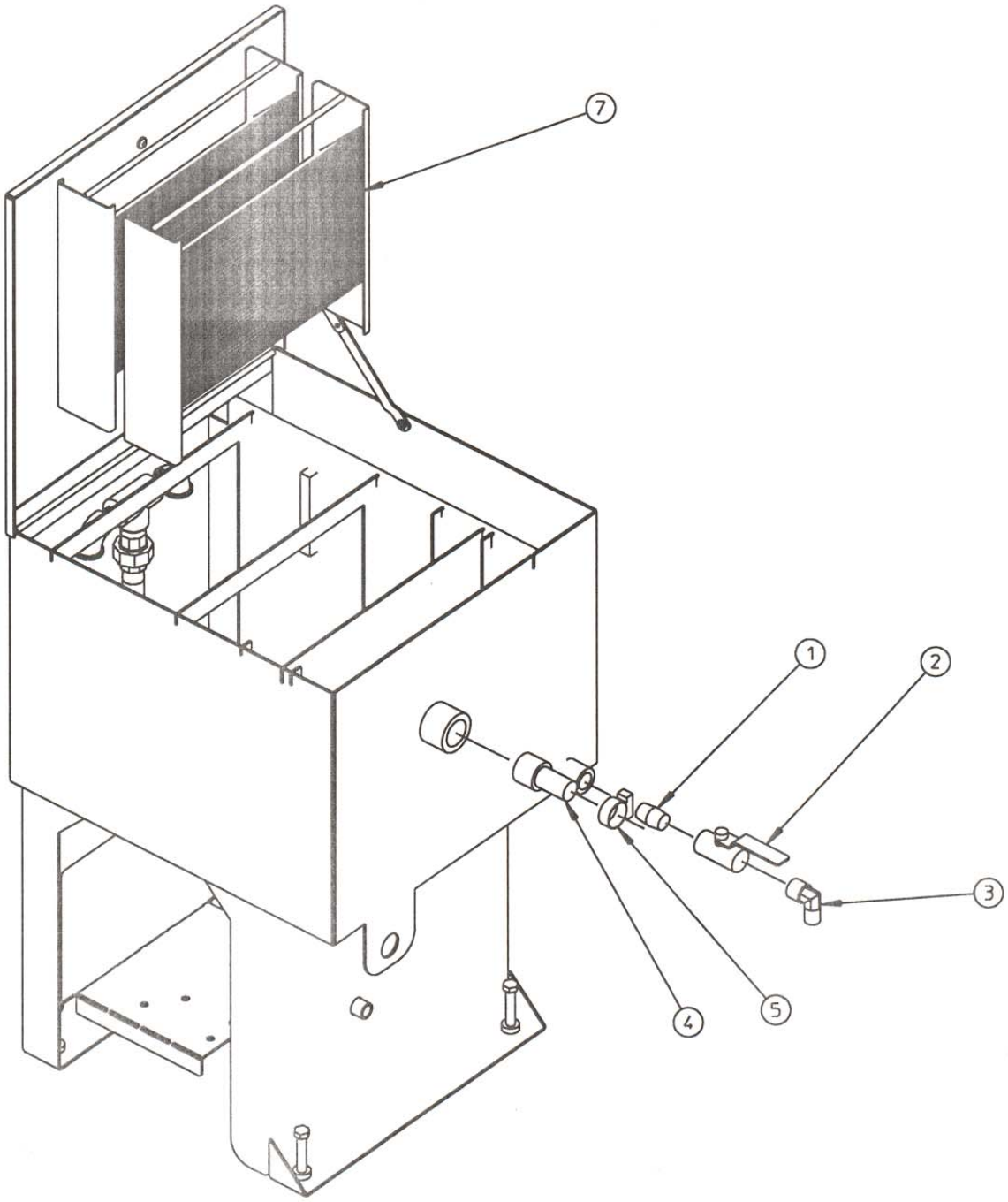
TRAMP OIL SYSTEM



ITEM NO.	CATALOG NO.	PART NAME
1	80A-100	Drain Valve Assembly
2	80A-200	Tri Vortex Skimmer Assembly
3	80A-300	Hose Stabilizer Assembly
4	80A-400	Regulator Assembly
5	80A-500	Strainer Filter Assembly
6	80A-600	Pump Assembly

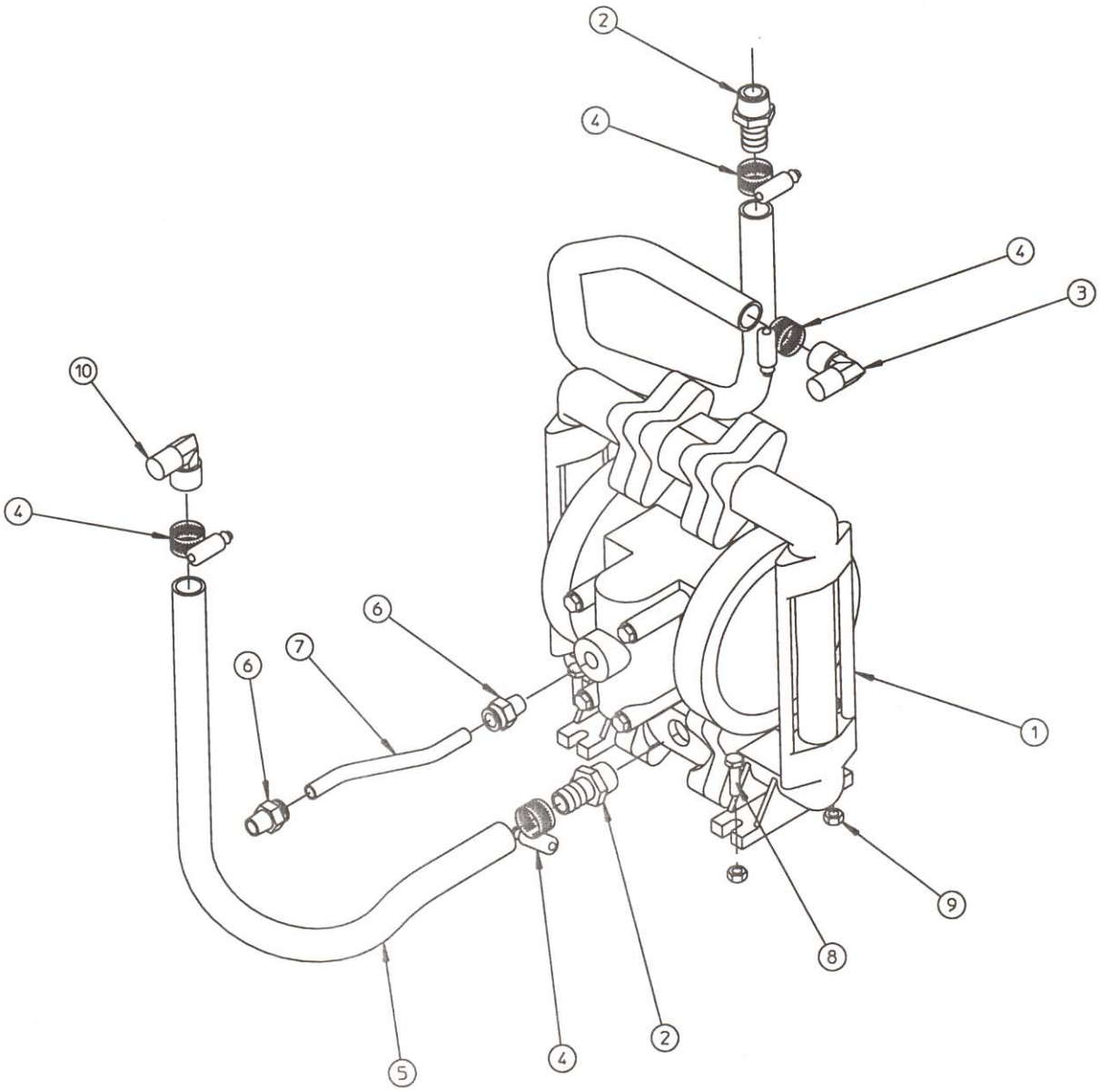
ITEM NO.	CATALOG NO.	PART NAME
7	80A-700	Tramp Oil Reservoir
8	80A-1	Hose, 1" I.D. Drain (7190-2606)
9	80A-27	Hose, Suction (7190-2500)
10	65A-106	Clamp, Hose (9874-1020)
11	80A-2	Knob, Handle (9880-1022) Note: (Specify if (8820-1001) Mounting Screw is required.)

TRAMP OIL RESERVOIR



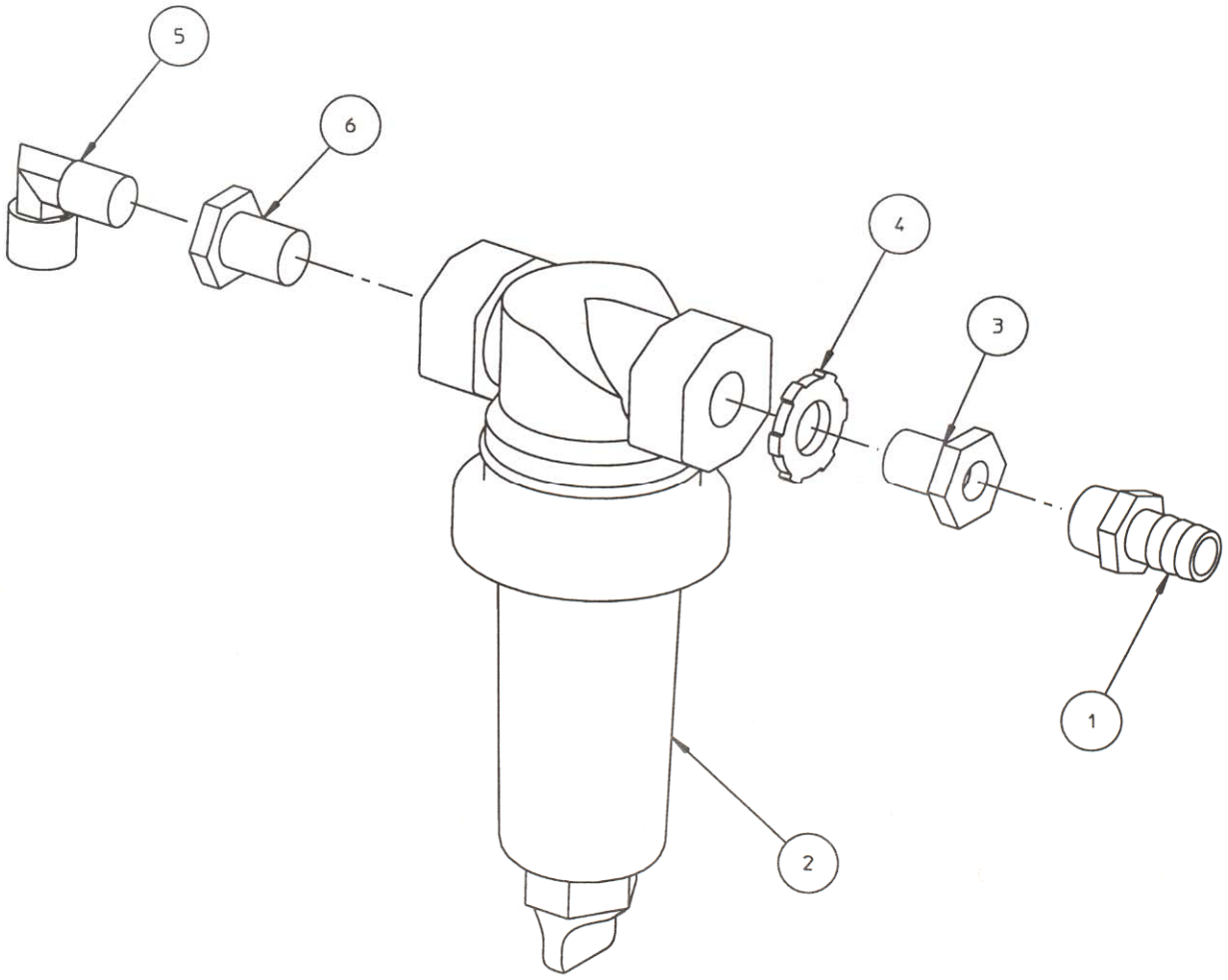
ITEM NO.	CATALOG NO.	PART NAME		ITEM NO.	CATALOG NO.	PART NAME
1	80A-3	Closed Nipple, ½"(8870-1004)		4	80A-6	Hose Barb, 1" (9871-1386)
2	80A-4	Ball Valve, ½" (9872-1053)		5	65A-106	Hose Clamp (9874-1023)
3	80A-5	90° Elbow, Brass (9871-2315)		7	80A-7	Plate Pack Modules (6280-6080)

TRAMP OIL SYSTEM (PNEUMATIC PUMP)



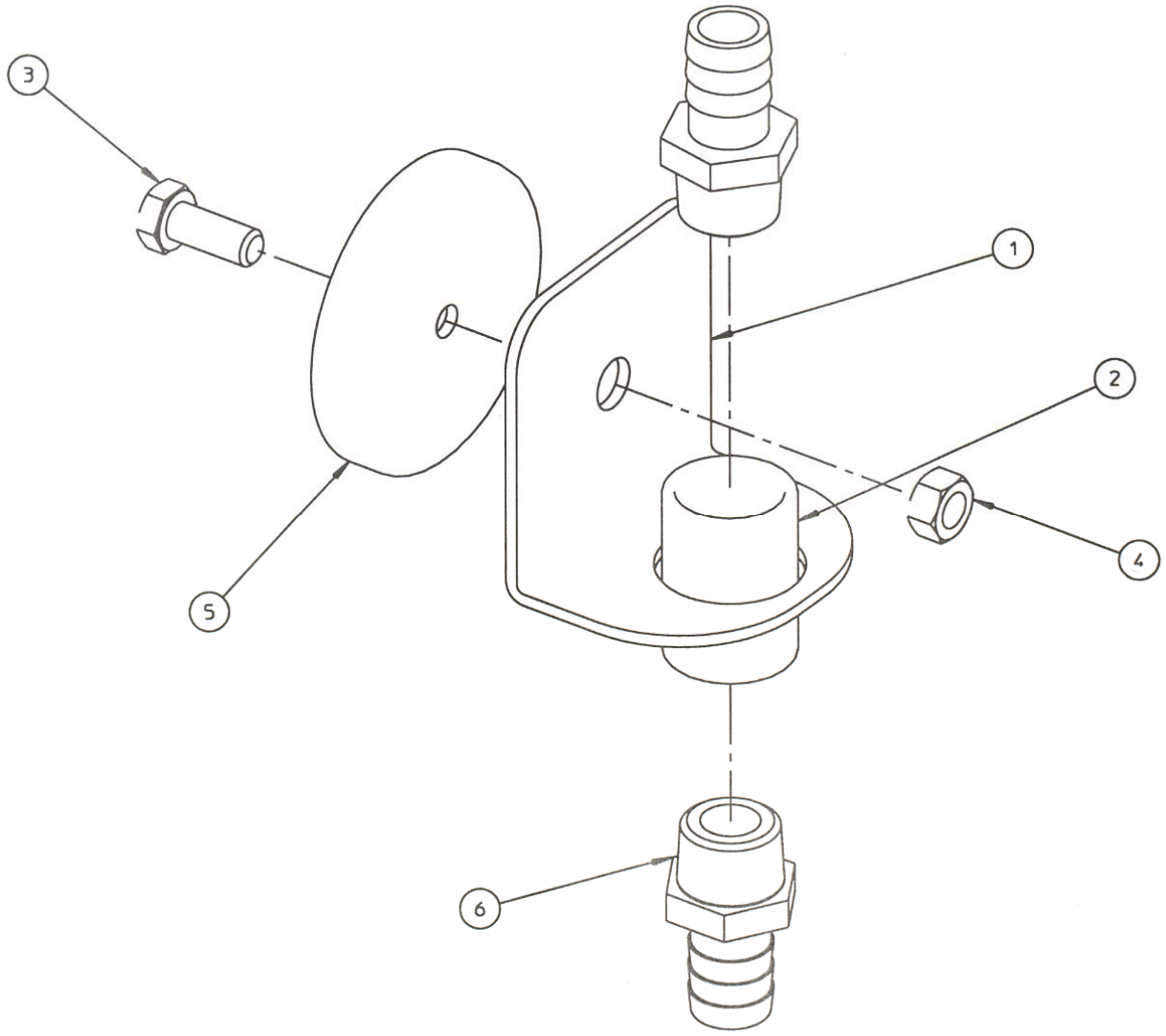
ITEM NO.	CATALOG NO.	PART NAME		ITEM NO.	CATALOG NO.	PART NAME
1	80A-8	Pump, Pneumatic (9869-1159)		6	80A-12	Push Lock Fitting, ¼
2	80A-9	Hose Barb, 5/8 (9871-2314)		7	80A-13	Flex Hose
3	80A-5	Hose Barb, 90° Elbow (9871-2315)		8	80A-14	Screw, HHC M6 X 25
				9	80A-15	Nut, Hex M6
4	80A-10	Hose Clamp (9874-1020)		10	80A-16	Washer, Lock M6
5	80A-11	Hose, 5/8 ID (7190-2460)				

STRAINER FILTER ASSEMBLY



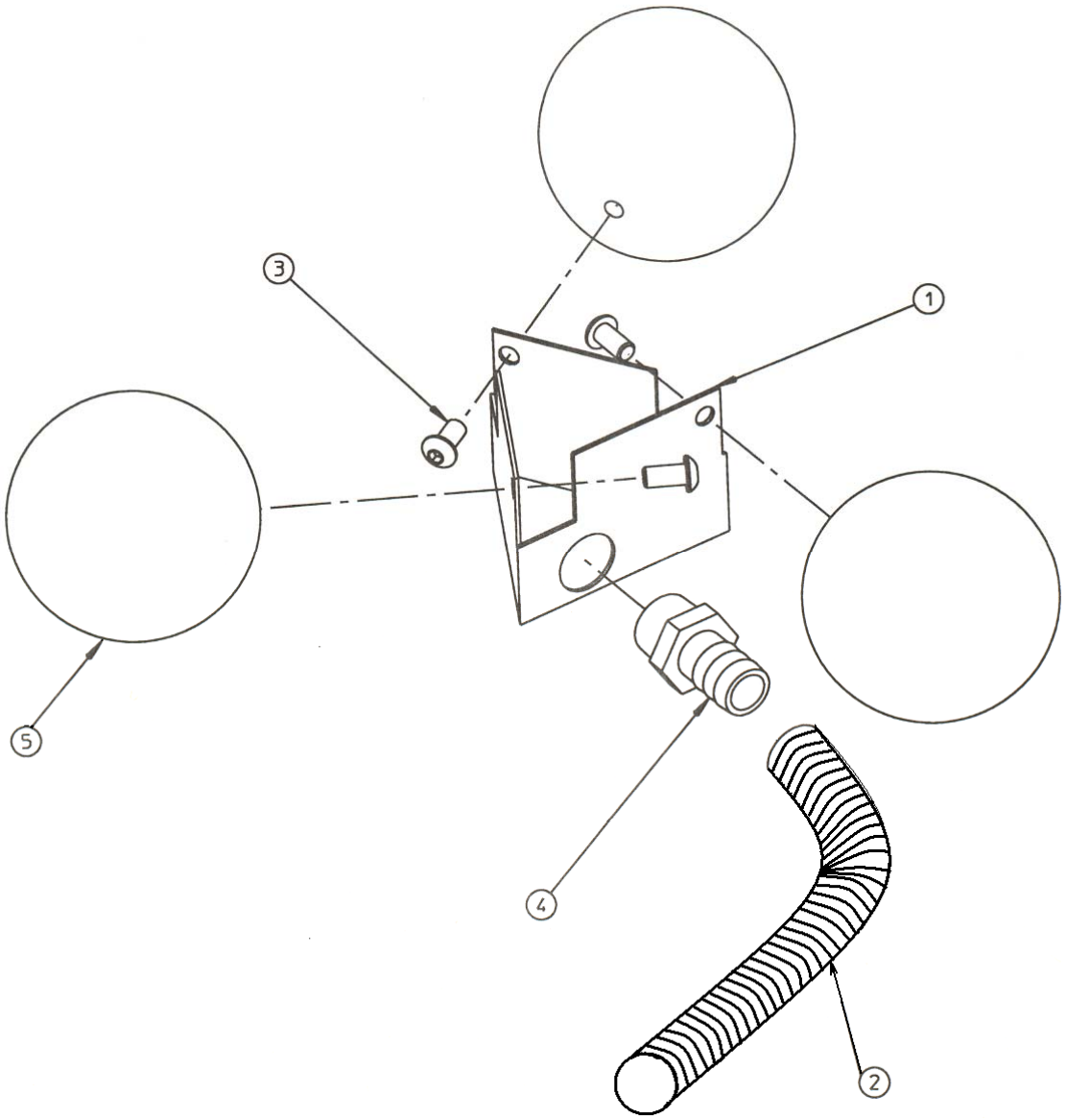
ITEM NO.	CATALOG NO.	PART NAME		ITEM NO.	CATALOG NO.	PART NAME
1	80A-9	Hose Barb, 5/8 (9871-2314)		4	80A-19	Jam Nut (9850-1039)
2	80A-17	Strainer Filter (9873-1110)		5	80A-5	Hose Barb 90° Elbow (9871-2315)
3	80A-18	Bushing Reducer (8871-1386)		6	80A-18	Bushing Reducer (8871-1386)

HOSE STABILIZER ASSEMBLY



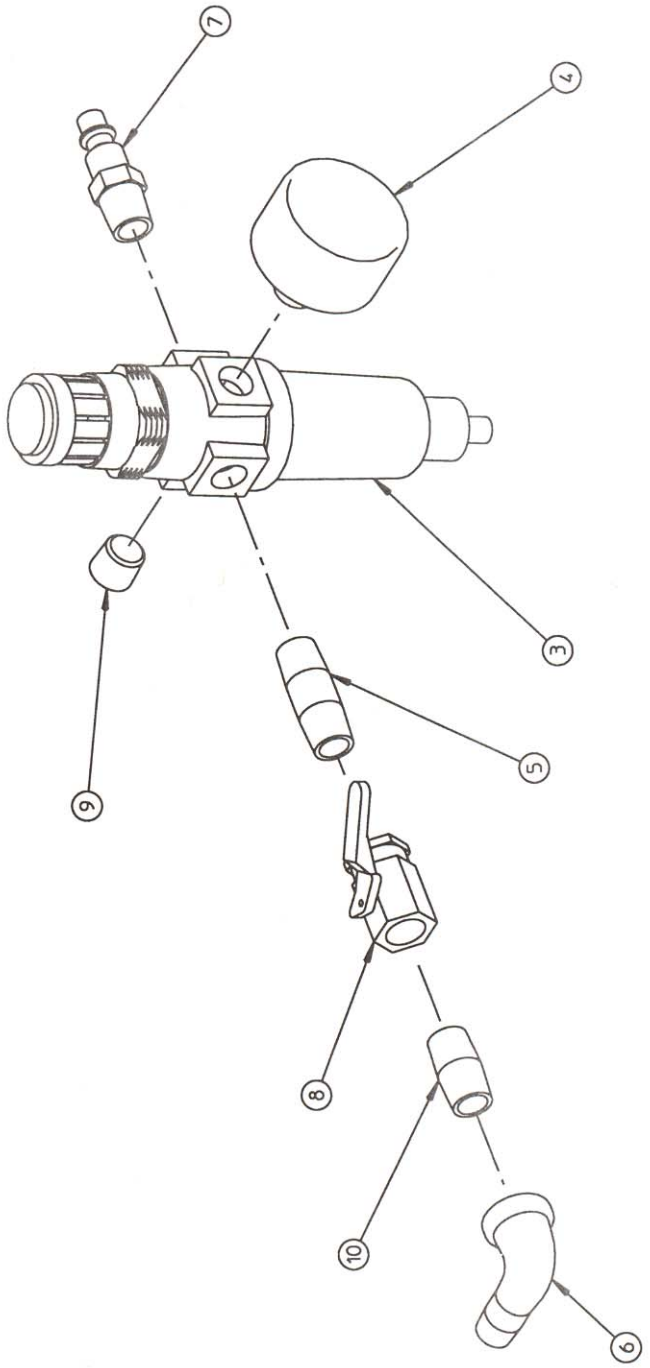
ITEM NO.	CATALOG NO.	PART NAME		ITEM NO.	CATALOG NO.	PART NAME
1	*80A-20	Bracket, Stabilizer (3280-0714)		4	80A-23	Nut, 5/16-18 (8850-1005)
2	*80A-21	Coupling, Full ½" (9871-1228)		5	80A-24	Magnet (9888-1421)
3	*80A-22	Screw, HHC 5/16-18 X 3/4 (8820-1018)		6	80A-25	Barbed Fitting, 5/8 (9871-1089)

TRI VORTEC SKIMMER ASSEMBLY



ITEM NO.	CATALOG NO.	PART NAME		ITEM NO.	CATALOG NO.	PART NAME
1	*80A-26	Skimmer Body (4280-4483)		5	*80A-29	Ball Float (9872-1065)
2	*80A-27	Hose, Suction (7190-2500)		6	*65A-106	Hose Clamp (9874-1020) (Not Shown)
3	*80A-28	Screw, ¼-20X1/4 (9826-3019)				
4	*80A-25	Adapter Fitting (9871-1089)		7	80A-200	Tri Vortex Skimmer Assembly (*Includes All Above Items)

REGULATOR ASSEMBLY



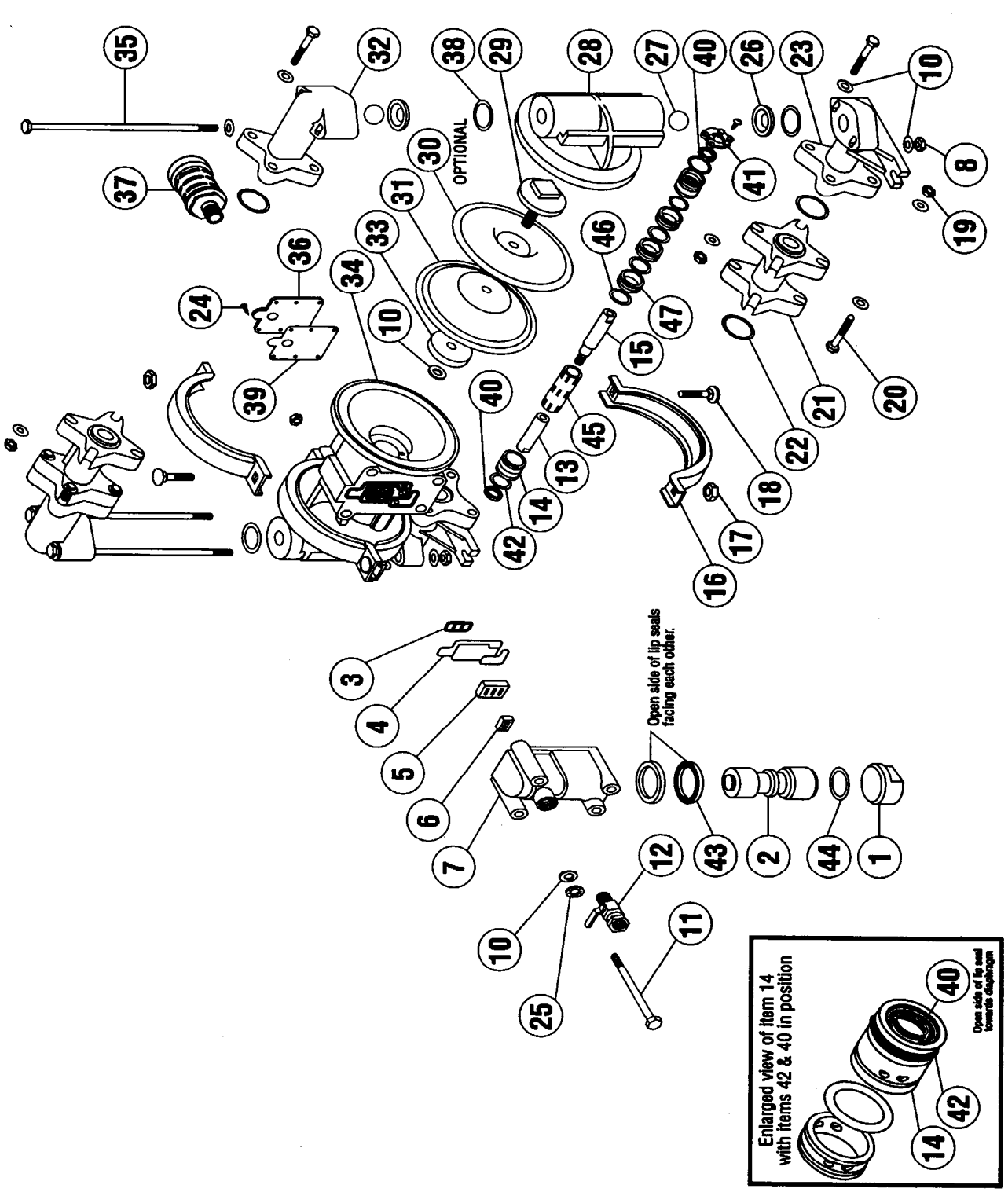
ITEM NO.	CATALOG NO.	PART NAME
3	80A-30	Air Regulator (9873-1037)
4	80A-31	Pressure Gauge (9873-1038)
5	80A-32	Nipple, ¼ X ¼ (8870-1036)
6	80A-33	Street Elbow, ¼ (8871-1119)

ITEM NO.	CATALOG NO.	PART NAME
7	80A-34	Connector, Air Hose (9874-1025)
8	80A-35	Air Valve
9	80A-36	Pipe Plug, ¼
10	80A-37	Close Nipple, ¼

PNEUMATIC PUMP PARTS LIST

ITEM NO.	CATALOG NO.	PART NAME
1	80B-1	Air Valve End Plug
2	80B-2	Air Valve Spool
3	80B-3	Gasket, Inner
4	80B-4	Gasket, Outer
5	80B-5	Valve Plate
6	80B-6	Shuttle
7	80B-7	Air Valve Body
8	80B-8	Lock Nut, ¼-20
10	80B-9	Washer, Flat
11	80B-10	Screw, Cap ¼ X 4 ½
12	80B-11	Air Flow Control Valve
13	80B-12	Diaphragm Rod (Short)
14	80B-13	End Spacer, Pilot Sleeve
15	80B-14	Diaphragm Rod (Long)
16	80B-15	Clamp Set (Complete with Fasteners)
17	80B-16	Nut, Hex 5/16-18
18	80B-17	Carriage Bolt, 5/16-8 X 1 ½
19	80B-18	Nut, Hex ¼-20
21	80B-19	Manifold Plug
23	80B-20	Suction Manifold
24	80B-21	Screw, #6 X 1/2
25	80B-22	Lock Washer
26	80B-23	Valve Seat
27	80B-24	Ball
28	80B-25	Outer Chamber
29	80B-26	Outer Diaphragm Plate
30	80B-27	Overlay
31	80B-28	Diaphragm
32	80B-29	Diaphragm Manifold
33	80B-30	Inner Diaphragm Plate
34	80B-31	Intermediate
35	80B-32	Cap Screw, ¼ X 7"
36	80B-33	Muffler Plate
37	80B-34	Muffler
38	80B-35	O-Ring, Valve Seat
39	80B-36	Gasket, Muffler Plate
40	80B-37	Lip Seal, Diaphragm Rod
41	80B-38	Retaining Plate
42	80B-39	O-Ring, End Spacer
43	80B-40	Lip Seal, Air Valve
44	80B-41	O-Ring, Valve Plug
45	80B-42	Pilot Sleeve
46	80B-43	O-Ring, Pilot Sleeve
47	80B-44	Inner Spacer, Pilot Sleeve

PNEUMATIC PUMP ASSEMBLY


OPTIONAL
Open side of lip seals facing each other.
Enlarged view of item 14 with items 42 & 40 in position
Open side of lip seal towards diaphragm